

TABLE 3.1-7 Estimated Hazard Quotients for Members of the General Public near the Paducah Site under Existing Environmental Conditions^a

Environmental Medium	Parameter	Assumed Exposure Concentration	Estimated Chronic Intake (mg/kg-d)	Reference Level ^b (mg/kg-d)	Hazard Quotient ^c
Air ^{d,e}	Uranium	0.02 µg/m ³	5.7×10^{-6}	0.0003	0.019
	HF	0.096 µg/m ³	2.7×10^{-5}	0.02	0.0014
Soil ^f	Uranium	5.8 µg/g	7.7×10^{-5}	0.003	0.026
Surface water ^{e,g}	Uranium	17 µg/L	9.3×10^{-6}	0.003	0.003
	Fluoride	< 224 µg/L	1.2×10^{-4}	0.06	0.002
Sediment ^{e,h}	Uranium	360 µg/g	6.2×10^{-6}	0.003	0.033
	Aroclor [®] 1254	1.4 µg/g	3.8×10^{-7}	0.00002	0.019
	Aroclor 1254 ⁱ	1.4 µg/g	5.5×10^{-8}	2 (slope factor)	1.1×10^{-7} (cancer risk)
Groundwater ^j	Uranium	600 µg/L	1.7×10^{-2}	0.003	5.7
	Fluoride	520 µg/L	1.5×10^{-2}	0.06	0.25

^a The receptor is assumed to be a long-term resident near the site boundary or another off-site monitoring location that would have the highest concentration of the contaminant being addressed; reasonable maximum exposure conditions were assumed. Only the exposure pathway contributing the most to intake levels was considered (i.e., inhalation for air and ingestion for soil, sediment, surface water, and groundwater). Residential exposure scenarios were assumed for air, soil, and groundwater analyses; recreational exposure scenarios were assumed for surface water and sediment analyses.

^b The reference level is an estimate of the daily human exposure level that is likely to be without an appreciable risk of deleterious effects. The reference levels used in this assessment are defined in Appendix F. For the carcinogen Aroclor 1254, the slope factor is also given. Slope factors in units of (mg/kg-d)⁻¹ are multiplied by lifetime average intake to estimate excess cancer risk.

^c The hazard quotient is the ratio of the intake of the human receptor to the reference level. A hazard quotient of less than 1 indicates that adverse health effects resulting from exposure to that chemical alone are unlikely. For carcinogens, the cancer risk (intake × slope factor) is also given. Increased cancer risks of between 10⁻⁶ and 10⁻⁴ are considered tolerable at hazardous waste sites; risks of less than 10⁻⁶ are considered negligible.

^d For the uranium air concentration, the reported concentration for uranium-238 and thorium-234 combined was used (DOE 2001b). No new HF air concentration data were available; the concentration reported in MMES (1994a,b) was used.

^e Exposure concentrations are the maximum annual averages for all monitoring locations.

^f Maximum uranium concentration from 10 facility boundary and off-site soil monitoring locations (LMES 1996a).

^g The uranium value is the maximum average surface water concentration from 20 sampling locations (DOE 2001b). No new fluoride concentration data were available; the concentration reported in MMES (1994a,b) was used.

^h Uranium sediment concentration is from LMES (1997a); PCB data are from LMES (1996a). Values reported in the 2000 environmental report are lower.

ⁱ Parameter analyzed for carcinogenic effects; all other parameters were analyzed for noncarcinogenic effects.

^j Data are maximum detected values for monitoring and residential wells located on or near DOE property at the Paducah site (none of the wells are currently used for drinking water). The maximum uranium concentration was observed in the upper continental recharge system; the maximum fluoride concentration was from the northwest plume, MW 237 (DOE 2001b). Several additional substances (most notably TCE and Tc-99) exceeded reference levels between 1993 and 1996; listed here are only substances of particular interest for this EIS.